MMICON

Hardware Manual

ICP DAS

Industrial Computer Products
Data Acquisition System

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1. Introduction

The MMICON is a compact size man-machine interface control board with a 4*4 keyboard interface , a 240*64 dots graphics LCD interface ,a RS-232C or RS-485 interface , 10 isolated digital input. This control board is designed to work with PC or PLC to implement a cost-effective man machine interface.

PC based user can use it to integrate a operator interface , instead of the regular monitor and keyboard. The MMICON has RS-232C or RS-485 (jumper selectable) port to communicate with PC. The PC can send out command to change the display page or send out the string to display on the specified location. The user should need a ND-6520 (RS-232C/RS-485 converter) to implement a RS-485 network .The PC can control up to 256 MMICON controllers in one 2-wire RS-485 network.

PLC user can use digital I/O port to communicate with the MMI-CON. The PLC send the page number through digital I/O and the MMI-CON will automatically display the related image stored in EEPROM.

When the user use OMRON PLC ,he can use RS-232C to communicate with MMI-CON port. The PLC send the page number into the PLC internal data memory (DM). The MMI-CON polls the data memory all the time and displays the value of the internal data memory. The DM value can be mixed with the image stored in EEPROM . The input value of the 4*4 KBD can be written into the data memory. Therefore it is also suitable as a man machine interface for PLC.
The user can edit the text and paint the Images using the utility in PC environment . The hex file can be programmed into the EEPROM by regular programmer.

The MMICON is a low cost man machine interface controller. The **MMICON Starter-Kit** is designed to demonstrate the function of MMICON. The Starter-Kit gives three demonstrations as following:

demo 1 : 5-24V digital I/O interface(for uP, PC or PLC I/O) **(240*64 LCD*256 pages)**
demo 2 : PC RS232 interface **(240*64 LCD*256 pages+4x4 KBD + Function_Key*8)**
demo 3 : Omron PLC RS232 interface (others soon) **(240*64 LCD*256 pages+4x4 KBD + Function_Key*8)**

The **MMICON** can be applied to various application as following:

Application 1 : 5-24V digital I/O interface(for uP, PC, PLC I/O)(refer to Chap. 2)
Application 2 : PC RS232 interface → refer to Chap. 3
Application 3 : PLC RS232 interface → refer to Chap. 4
Application 4 : PC RS485 inteface → refer to Chap. 5

Application 1 → select MMICON mode 0 → initial mode(with JP2 in INIT position)
Application 2 → select MMICON mode 1/2 → (with JP2 in normal position)
Application 3 → select MMICON mode 1 → (with JP2 in normal position)
Application 4 → select MMICON mode 3 → (with JP2 in normal position)

Mode 0 : initial mode → with JP2 in **INIT** position

- ③ Suitable for application 1
- ③ Module address = 00
- ③ **Only in this mode can change to other mode**

Mode 1 : PC RS232/RS485 mode → with JP2 in **normal** position

- ③ Module address stored in MMICON internal eeprom (not LCD image EPROM)
- ③ Suitable for application 2 : PC RS232 interface**(J7 in 1-2, J8 in 1-2)**
- ③ Suitable for application 4 : PC RS485 interface**(J7 in 2-3, J8 in 2-3)**
- ③ KBD input will be stored in buffer until PC read

Mode 2 : PC RS232 mode → with JP2 in **normal** position

- ③Module address stored in MMICON internal eeprom (not LCD image EPROM)
- ③ Suitable for application 2 : PC RS232 interface**(J7 in 1-2, and J8 in 1-2)**
- ③KBD input will return to PC immediately.

Mode 3: PLC RS232 mode → with JP2 in **normal** position

- ③Suitable for application 3 : PLC RS232 interface**(J7 in 1-2 and J8 in 1-2)**

Factory Setting :
(1) : JP2 in **INIT** position → **mode 0**
(2) : J7 in 1-2, J8 in 1-2
(3) : (if move JP2 to **normal** position → **Mode 3)**

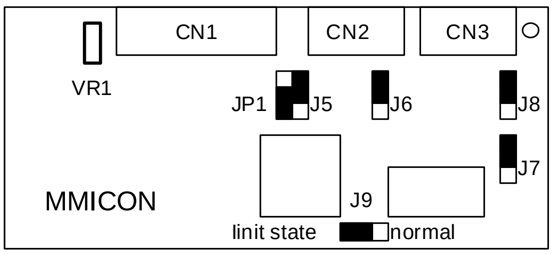
Refer to "MMIDOS Software User Manual" for how to change operation mode.

1.1.1 Specifications

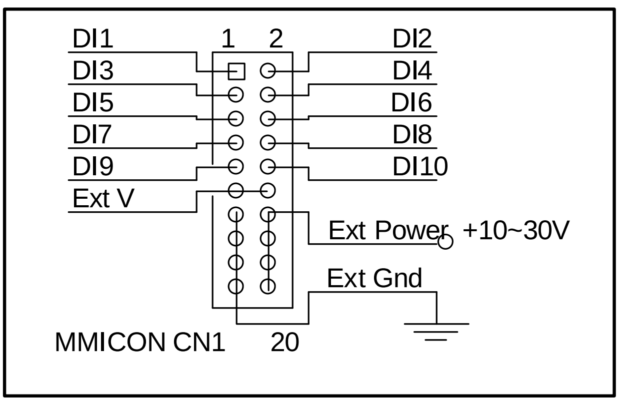
- ③ Board dimension : 162 mm * 70 mm
- ③ LCD display area : 107.97 mm * 77 mm
- ③ LCD dots : 240 * 64 dots
- ③ EPROM size : 128K/256K/512K
- ③ DI input impedance : 3K
- ③ Power Requirement : 10V-30V DC, 1A

1.1.2 Board Layout & Jumper Setting

Board layout is given as following: (default setting)



1.1.3 CN1: 5-24V DI and Power Input connector

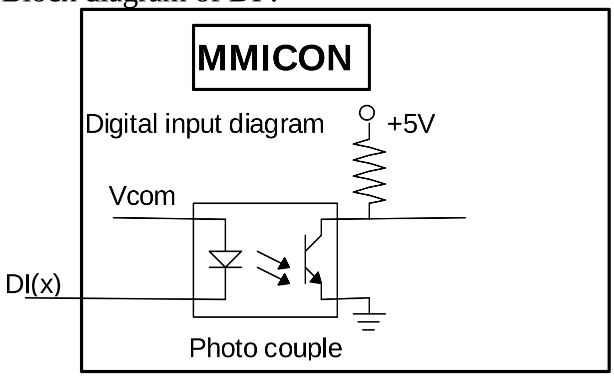


Pin Assignment of CN1.

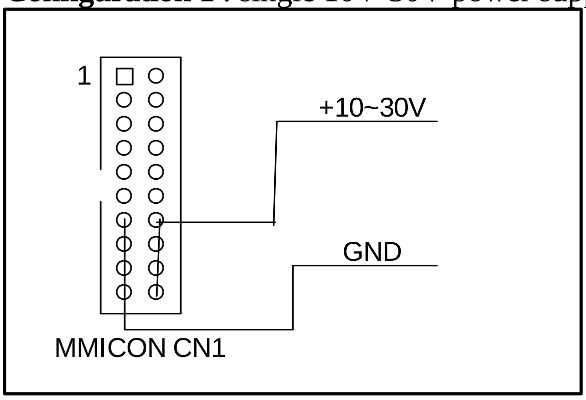
Pin Assignment	Description	Pin Assignment	Description
1	DI 1	2	DI 2
3	DI 3	4	DI 4
5	DI 5	6	DI 6
7	DI 7	8	DI 8
9	DI 9	10	DI 10
11	Ext V	12	Ext V
13	Ext Gnd	14	Ext Power
15	Ext Gnd	16	Ext Power
17	Ext Gnd	18	Ext Power
19	Ext Gnd	20	Ext Power

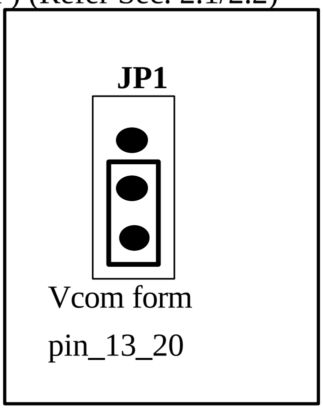
External Power : can be 10V to 30V

Block diagram of DI :



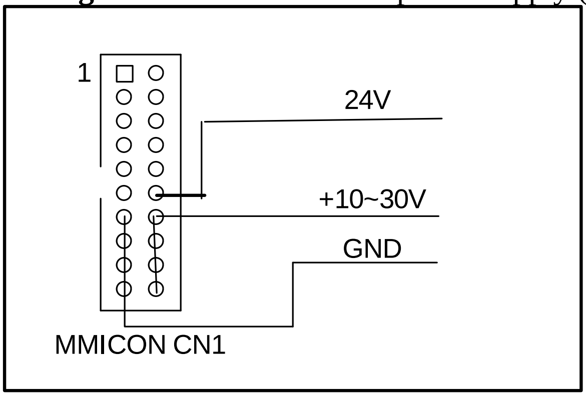
Configuration 1 : single 10V-30V power supply (non-isolation) (Refer Sec. 2.1/2.2)

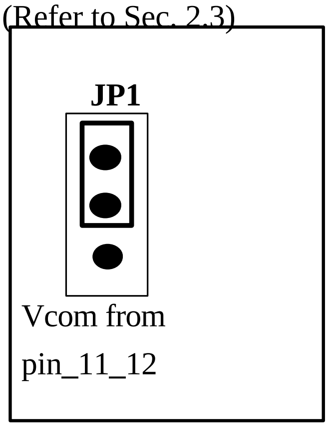




Vcom=10V-30V
DI(x) can be **relay contact**
or **open collector output**

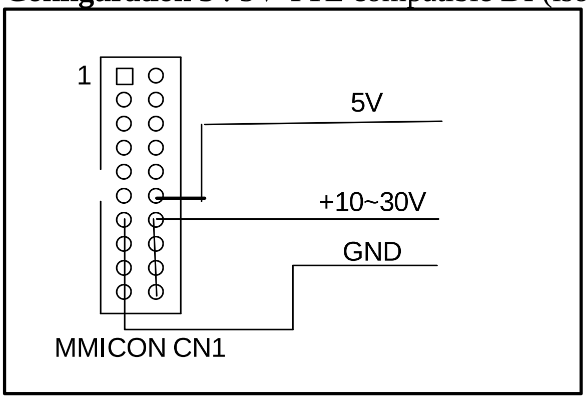
Configuration 2 : double 24V power supply (isolation input) (Refer to Sec. 2.3)

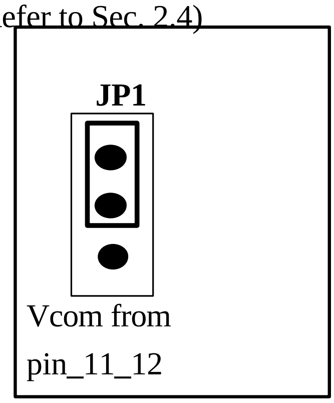




Vcom=24V
DI(x) can be **relay contact**
or **open collector output**

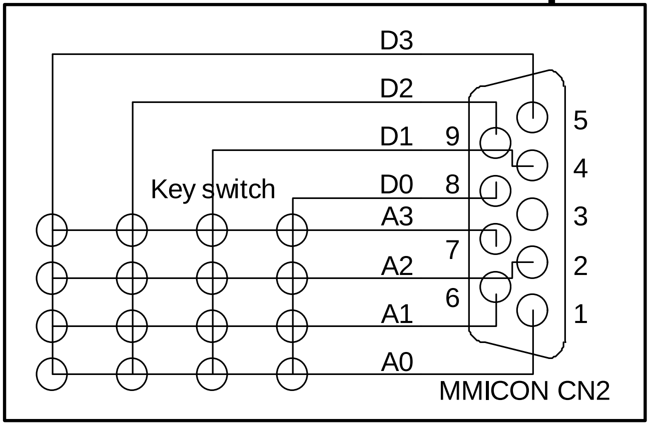
Configuration 3 : 5V TTL compatible DI (isolation input) (Refer to Sec. 2.4)



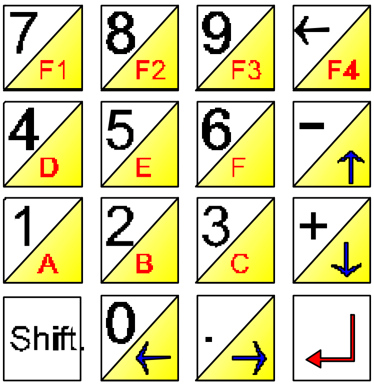


Vcom=5V
DI(x) can be TTL compatible signal

1.1.4 CN2 : 4*4 KBD input connector



4*4 KBD definition in mode 3 (PLC-RS232)

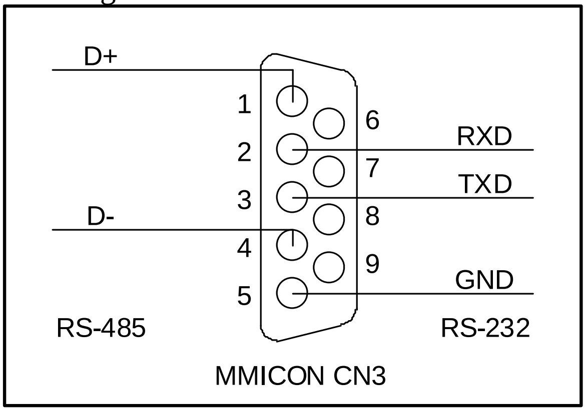


4*4 KBD return code in mode 1/2/3 (PC-RS232/RS485)

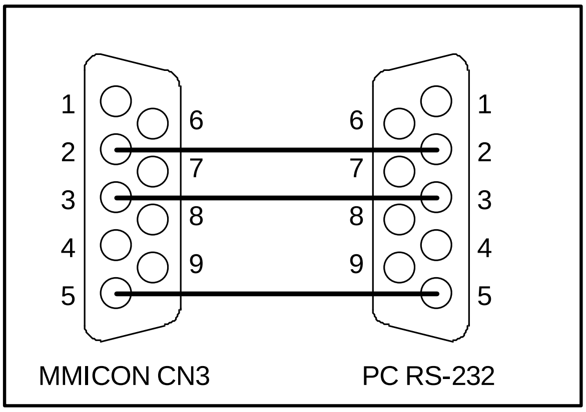
KEY-CODE	KEY NAME	KEY-CODE	KEY NAME	KEY-CODE	KEY NAME
0x01	**0**	0x11	←	0x20	**Function-key1**
0x02	**.**	0x12	→	0x21	**Function-key2**
0x03	**Enter**	0x13	**Enter**	0x22	**Function-key3**
0x04	**1**	0x14	**A**	0x23	**Function-key4**
0x05	**2**	0x15	**B**	0x24	**Function-key5**
0x06	**3**	0x16	**C**	0x25	**Function-key6**
0x07	+	0x17	**v**	0x26	**Function-key7**
0x08	**4**	0x18	**D**	0x27	**Function-key8**
0x09	**5**	0x19	**E**		
0x0A	**6**	0x1A	**F**		
0x0B	**-**	0x1B	^		
0x0C	**7**	0x1C	**F1**		
0x0D	**8**	0x1D	**F2**		
0x0E	**9**	0x1E	**F3**		
0x0F	**Back Space**	0x1F	**F4**		

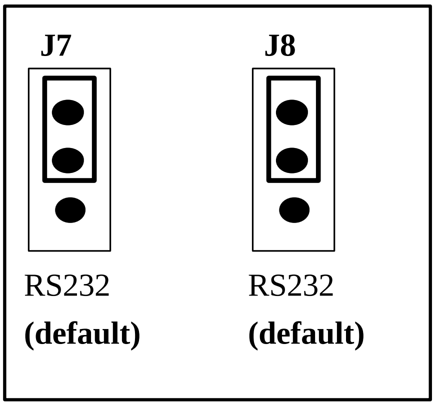
1.1.5 CN3 : RS232/RS485 connector

Pin assignment of CN3 :

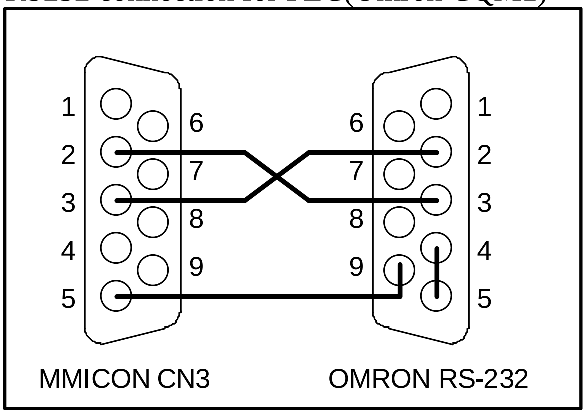


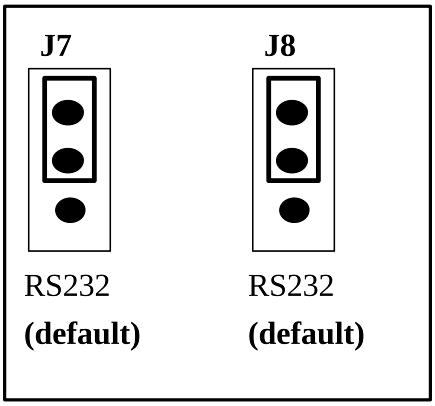
RS232 connection for PC



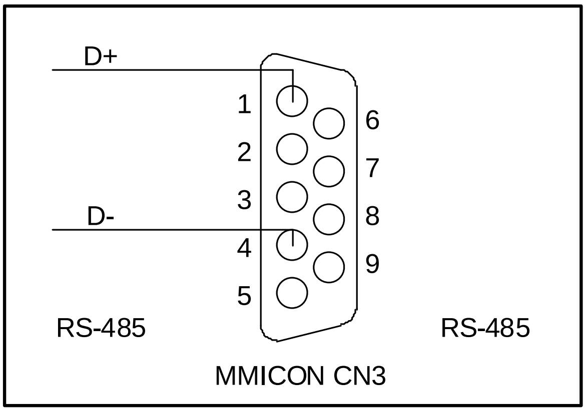


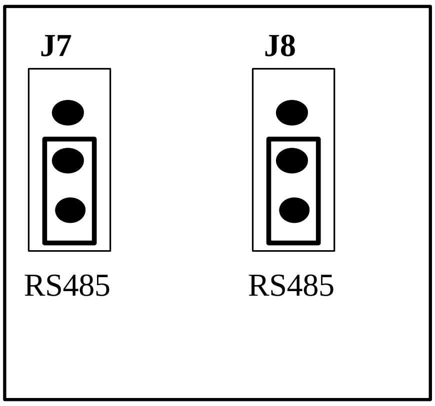
RS232 connection for PLC(Omron CQM1)





RS485 connection.





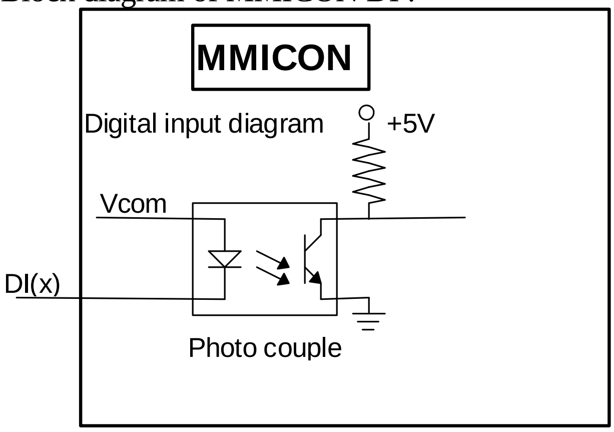
1.1.6 VR1 : LCD Brightness Adjustment

Turn VR1 can change the brightness of LCD display.

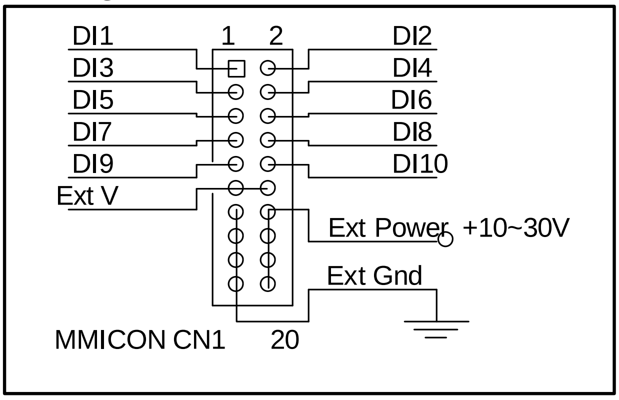
1.1.7 JP1 : Vcom Selection Connector

Vcom is the common source of MMICON DI. The Vcom can be come from pin_11_12 of CN1 of from pin 13-20 of CN1. There are various DIO connections introduced in Chapter 2 which will select the different Vcom configuration. Refer to Chapter 2 for details.

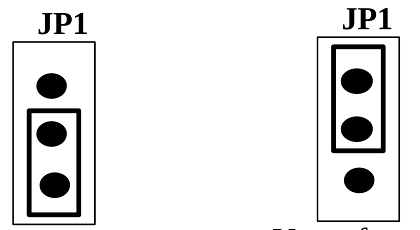
Block diagram of MMICON DI :



Pin assignment of CN1.



Vcom : can be from **pin_11_12** or **pin_13_20**



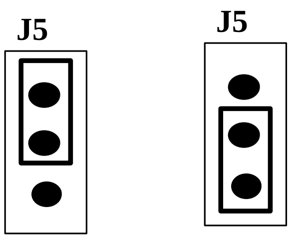
Vcom from pin_13_20 **(default)**

Vcom from pin_11_12

1.1.8 J5,J6 : Frame Ground Selection Connector

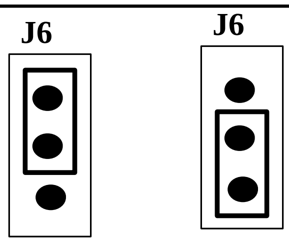
J5 : enable/disable the **frame ground** of CN2 connecting to **GND** of MMICON

J6 : enable/disable the **frame ground** of CN3 connecting to **GND** of MMICON



disable **(default)**

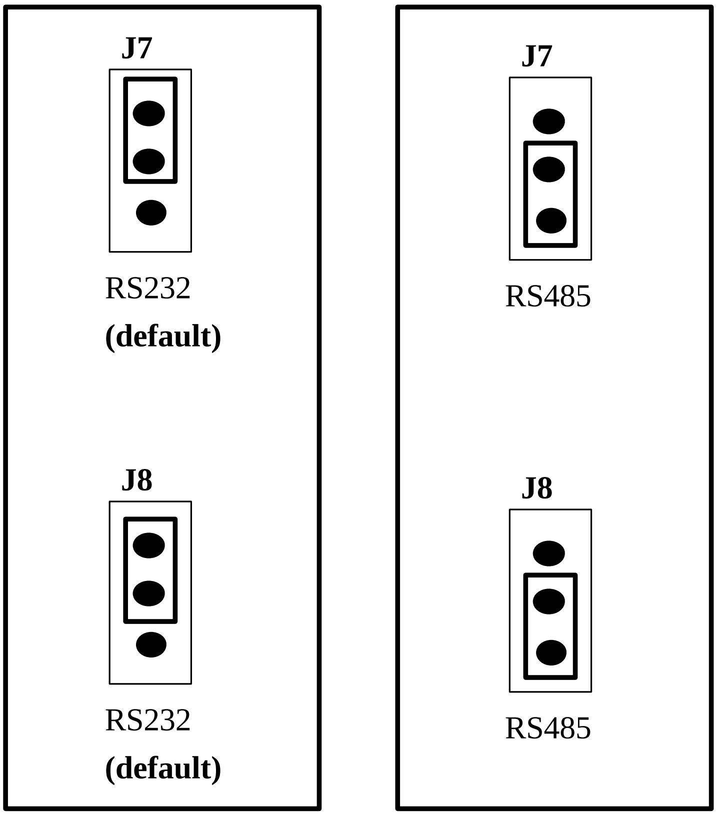
enable



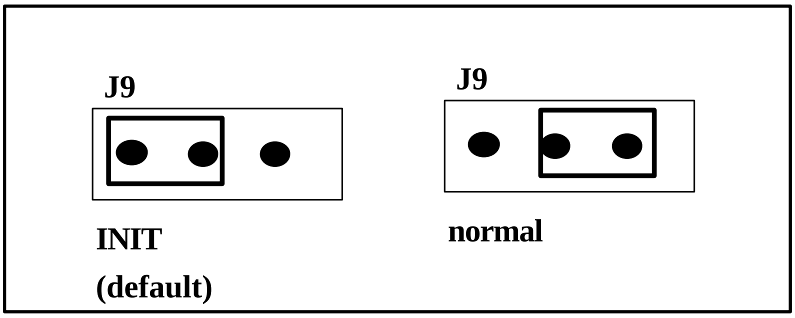
disable **(default)**

enable

1.1.9 J7,J8 : RS232/RS485 Selection Connector



1.1.10 J9 : INIT State Selection Connector



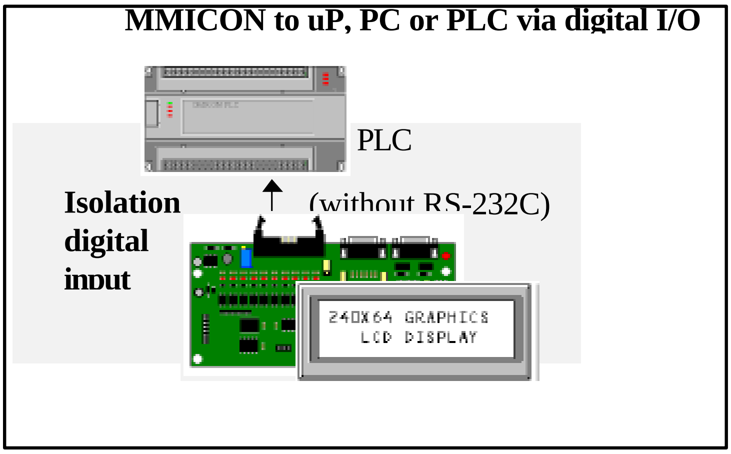
Select INIT position will force the MMICON go to initial state as following :

1. **Module address=00**
2. **RS232 baudrate = 9600**
3. **Working in operation mode 0**
4. **Only this mode can change operation mode.**

Refer to "MMIDOS Software User Manual" for details.

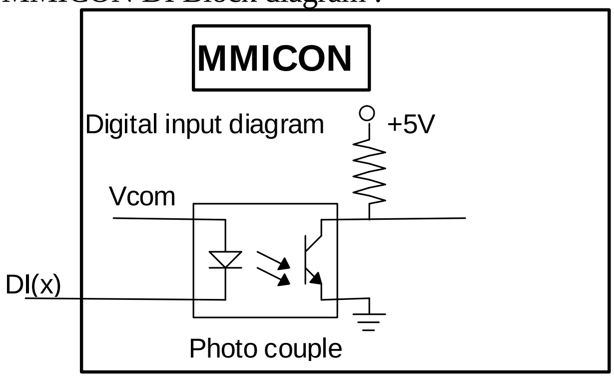
2. 5V-24V I/O Interface Application

J9 must select <u>INIT</u> position.

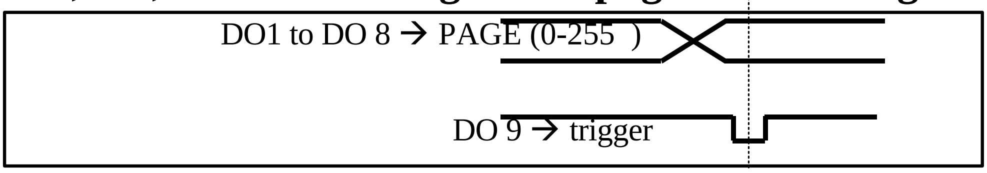


uP → use 5V TTL compatible DO (Sec. 2.4)
PC based IO cards → use 5V TTL compatible DO or 24V DO (Sec. 2.1/2.2/2.3/2.4)
PLC → use 24V relay or open collector DO (Sec. 2.1/2.2/2.3)

MMICON DI Block diagram :

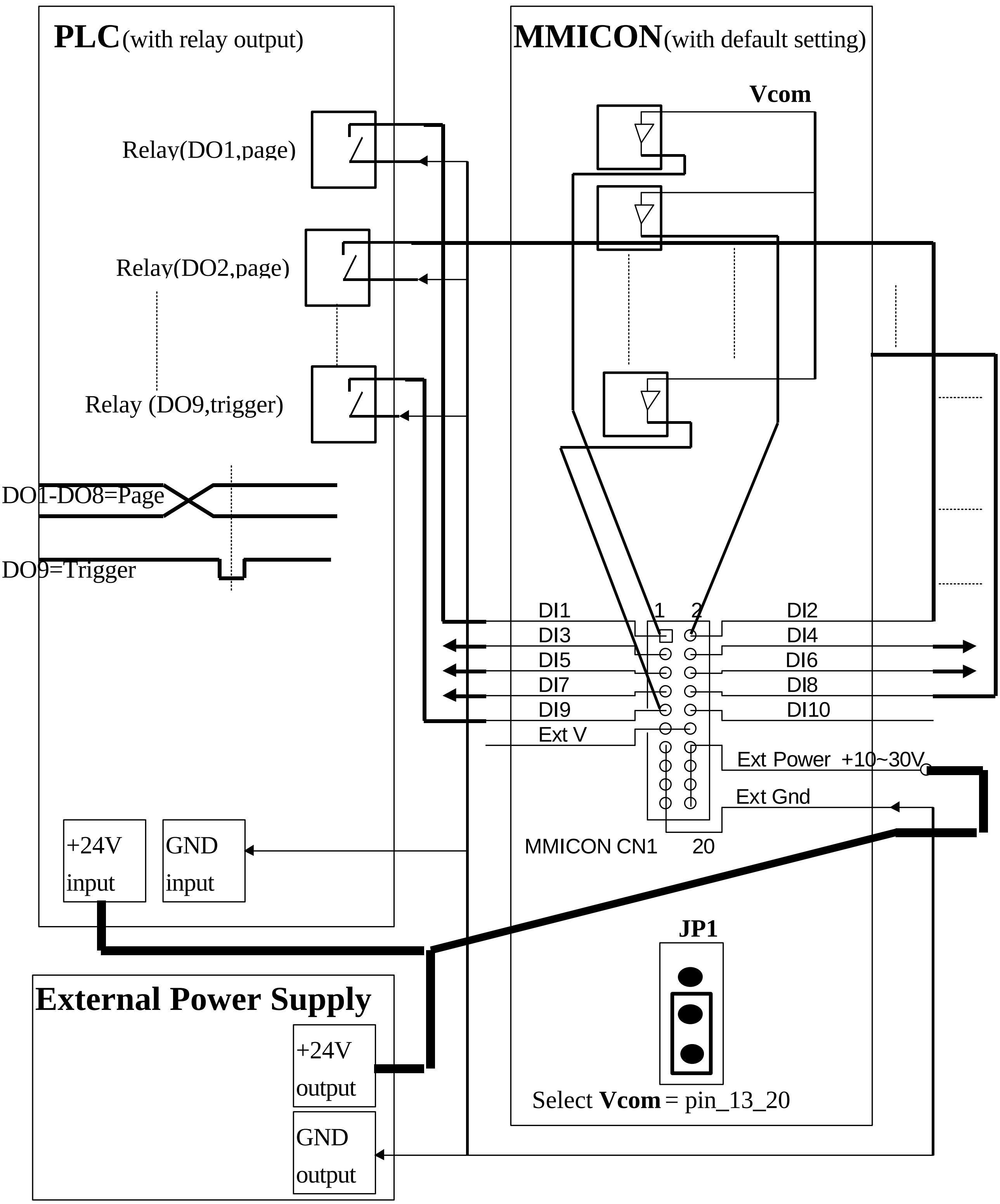


uP, PC, PLC DO change LCD page control diagram:



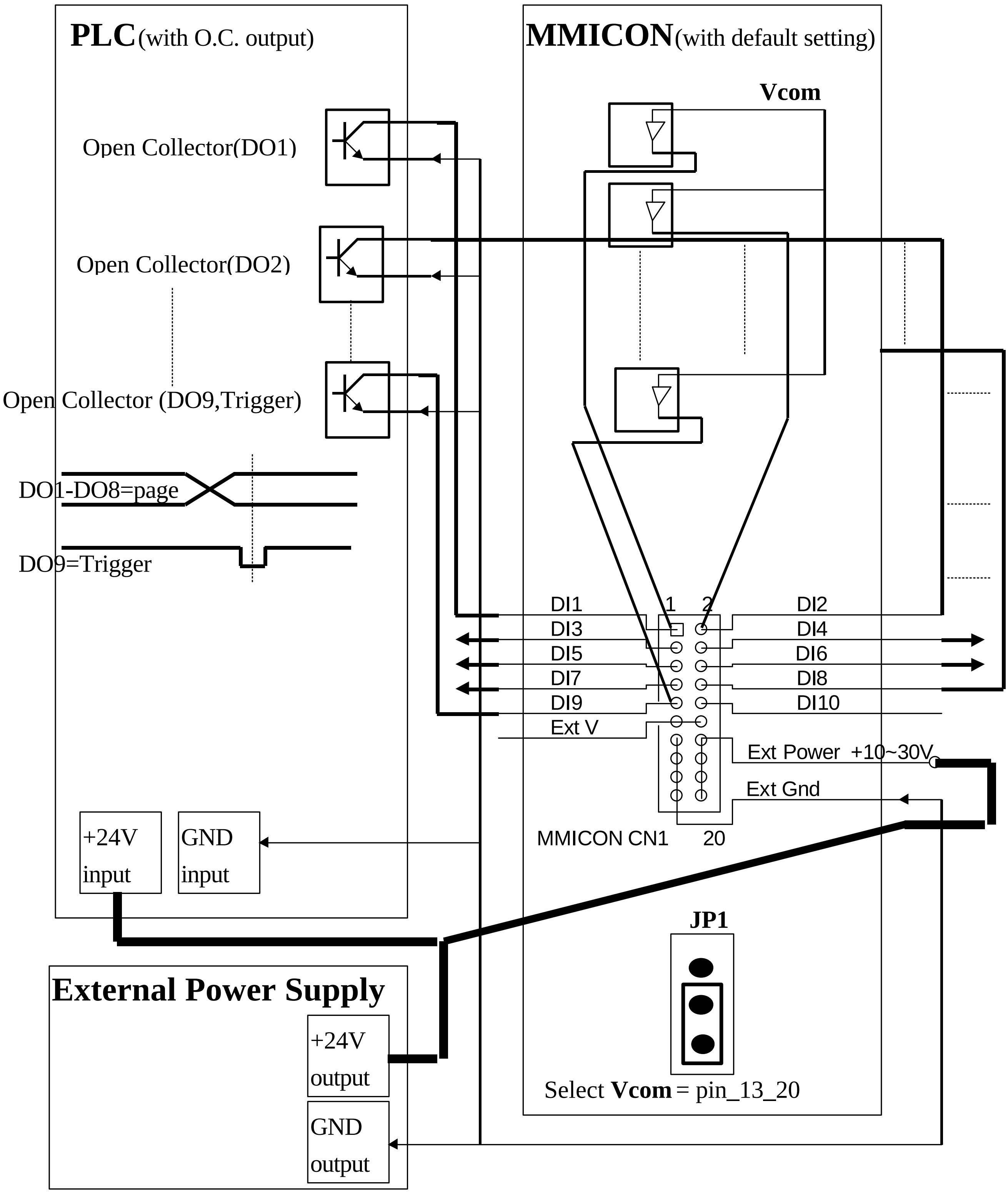
2.1 DIO Connection 1 : 24V non-Isolated

Single external power supply+PLC_relay_output+non-isolated-connection



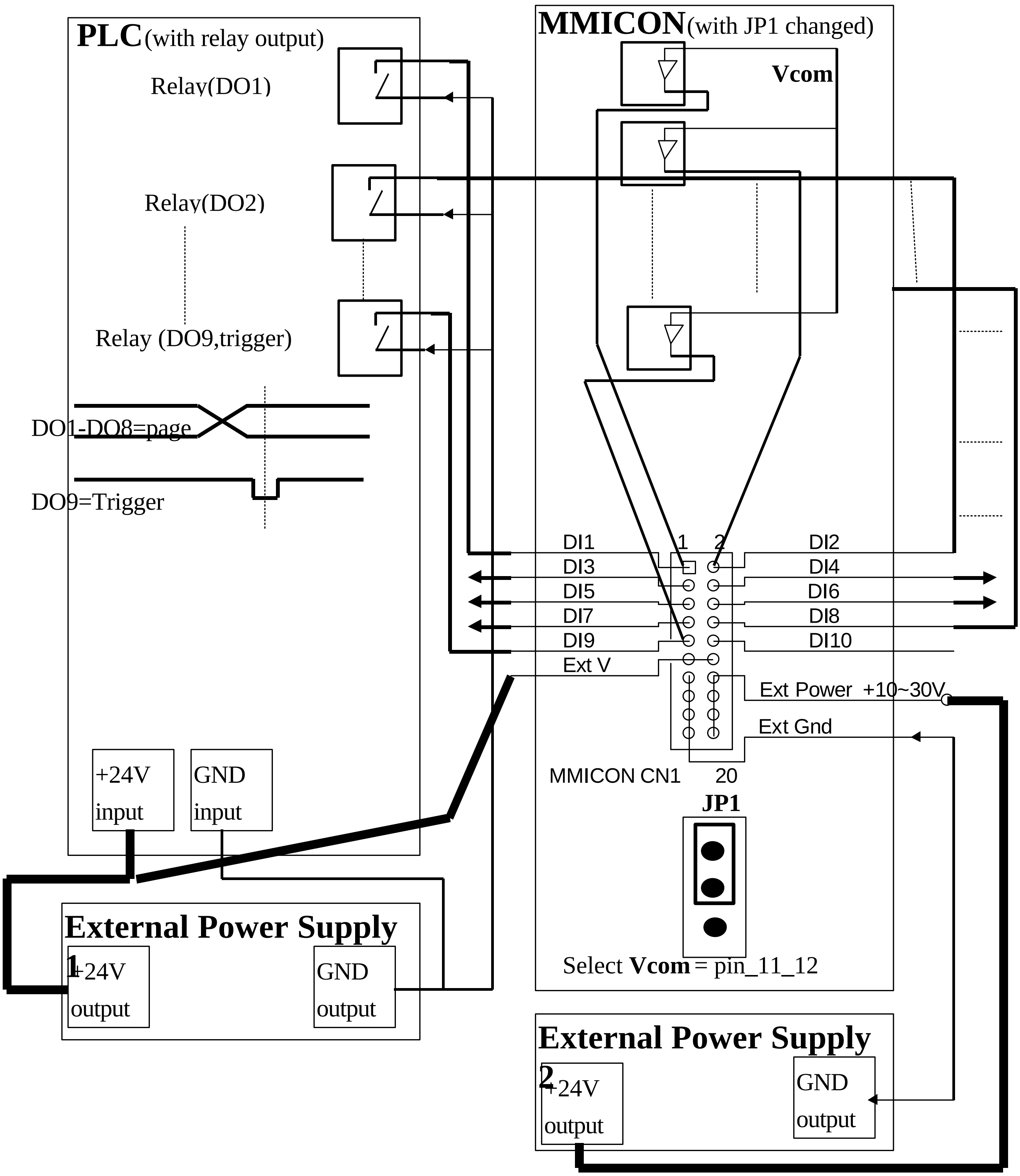
2.2 DIO Connection 2 : 24V non-Isolated

Single external power supply+PLC_O.C._output+non-isolated-connection



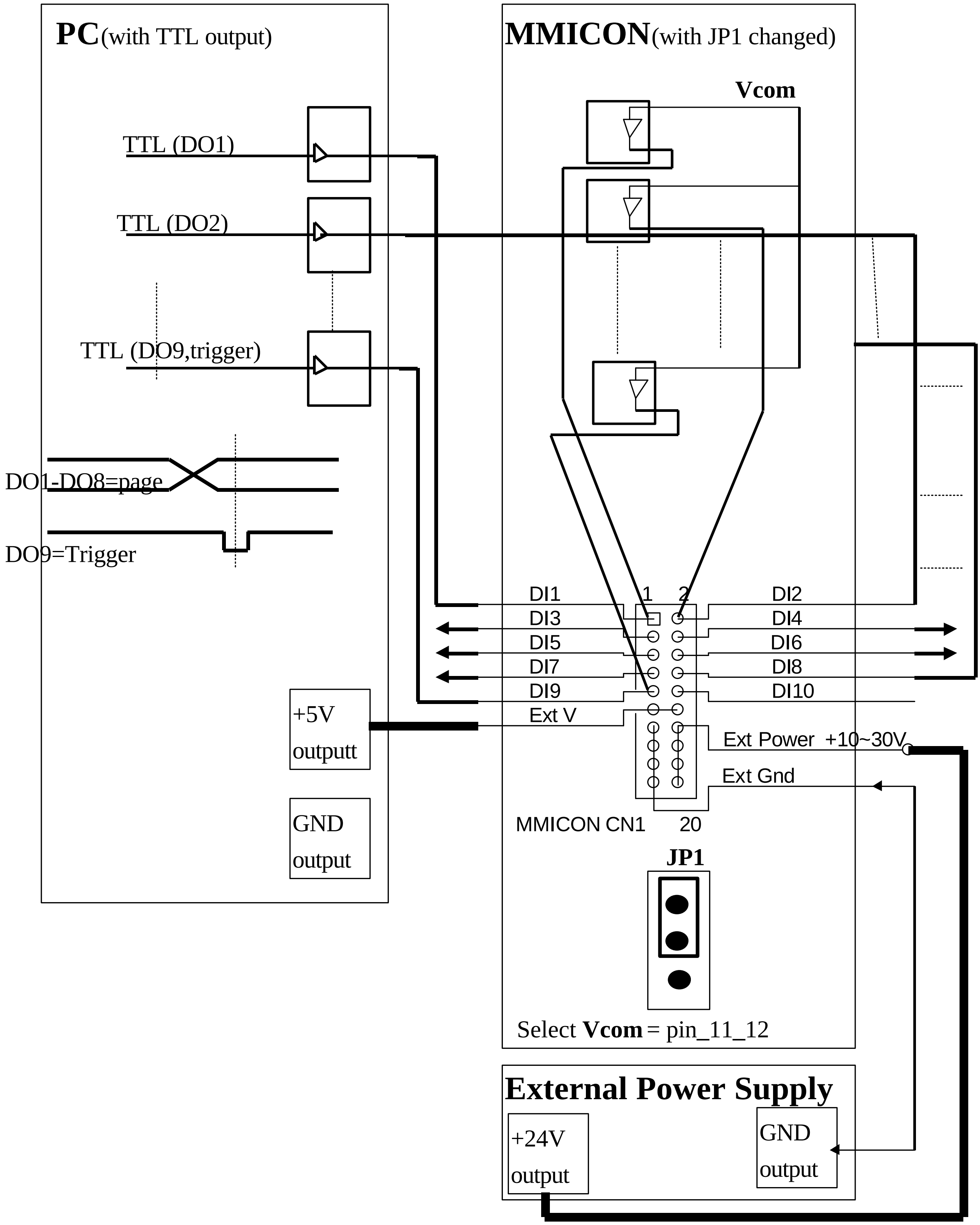
2.3 DIO Connection 3 : 24V Isolated

Double external power supply+PLC_relay_output + isolated-connection



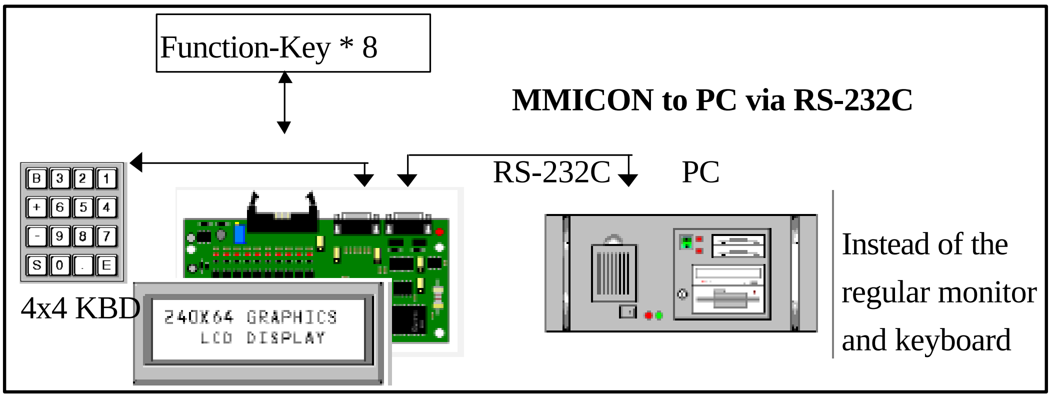
2.4 DIO Connection 4 : 5V Isolated

Single external power supply+PC_TTL_output + isolated-connection

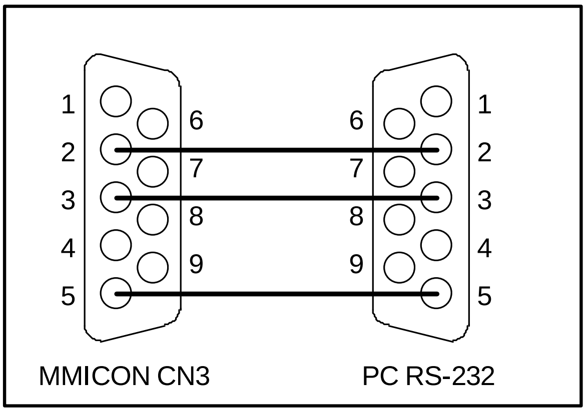


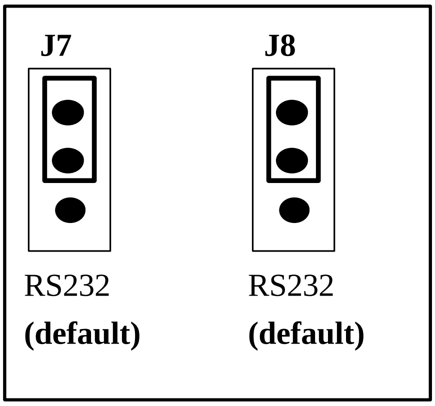
3. PC RS232 Interface Application

J9 must select normal position.

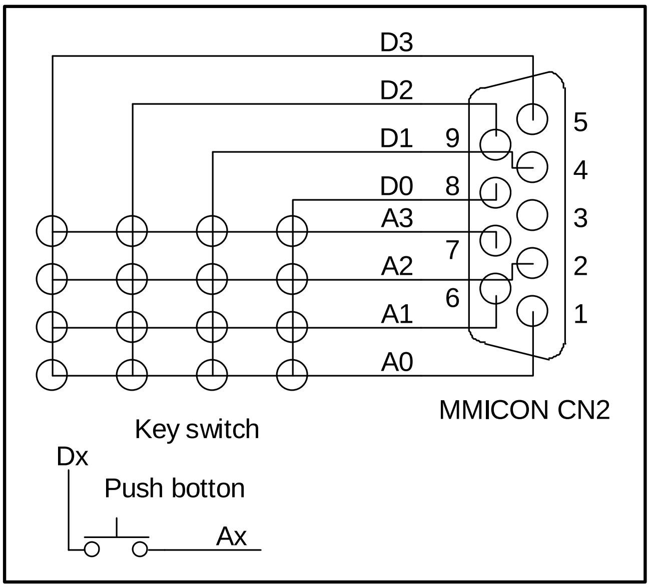


RS232 connection.

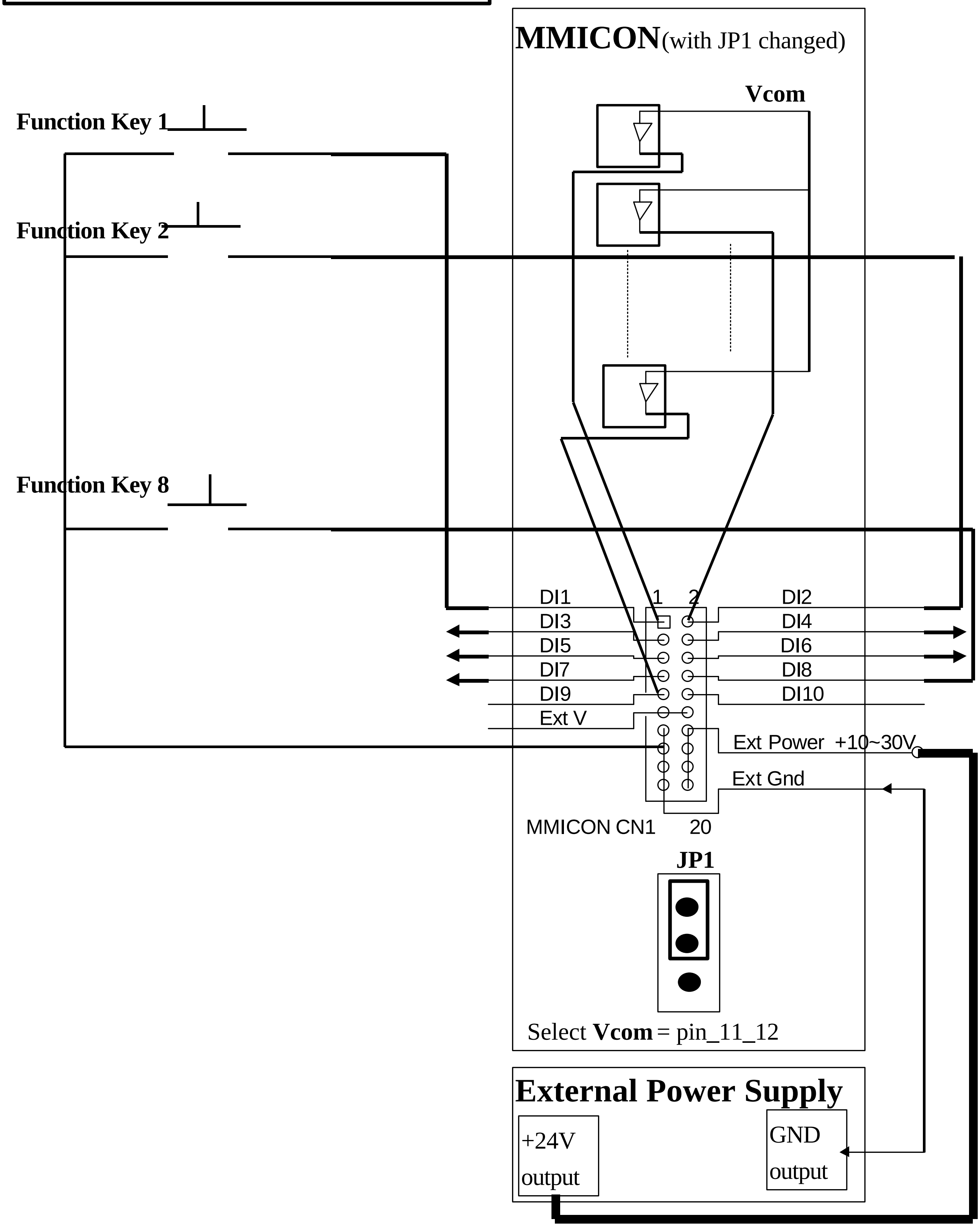




4*4 KBD connection



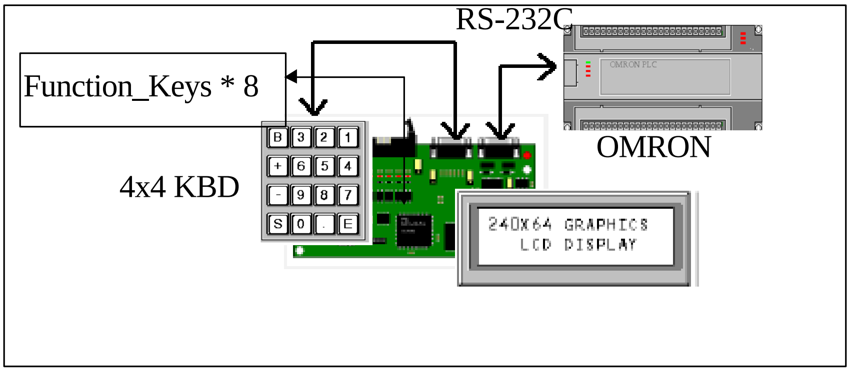
Function Key * 8 connection diagram.



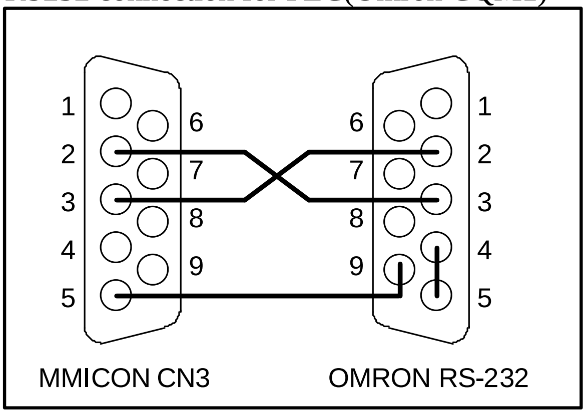
4. PLC RS232 Interface Application

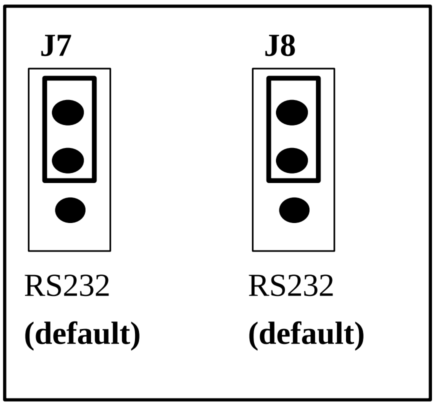
J9 must select <u>normal</u> position.

MMICON to OMRON PLC via RS-232C

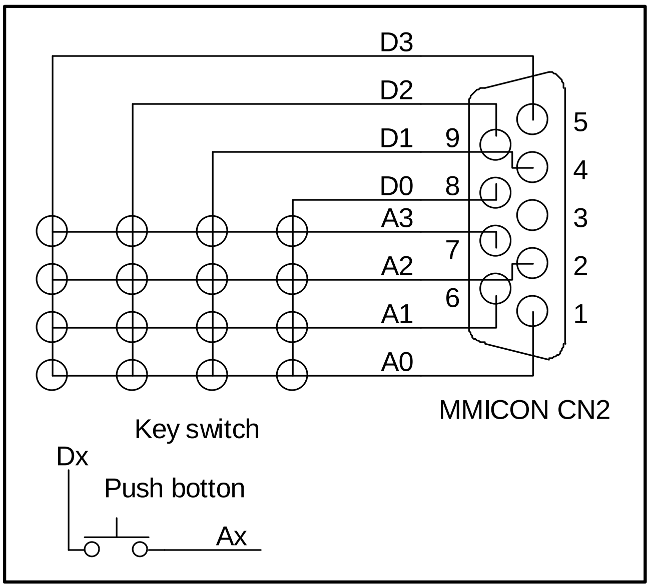


RS232 connection for PLC(Omron CQM1)

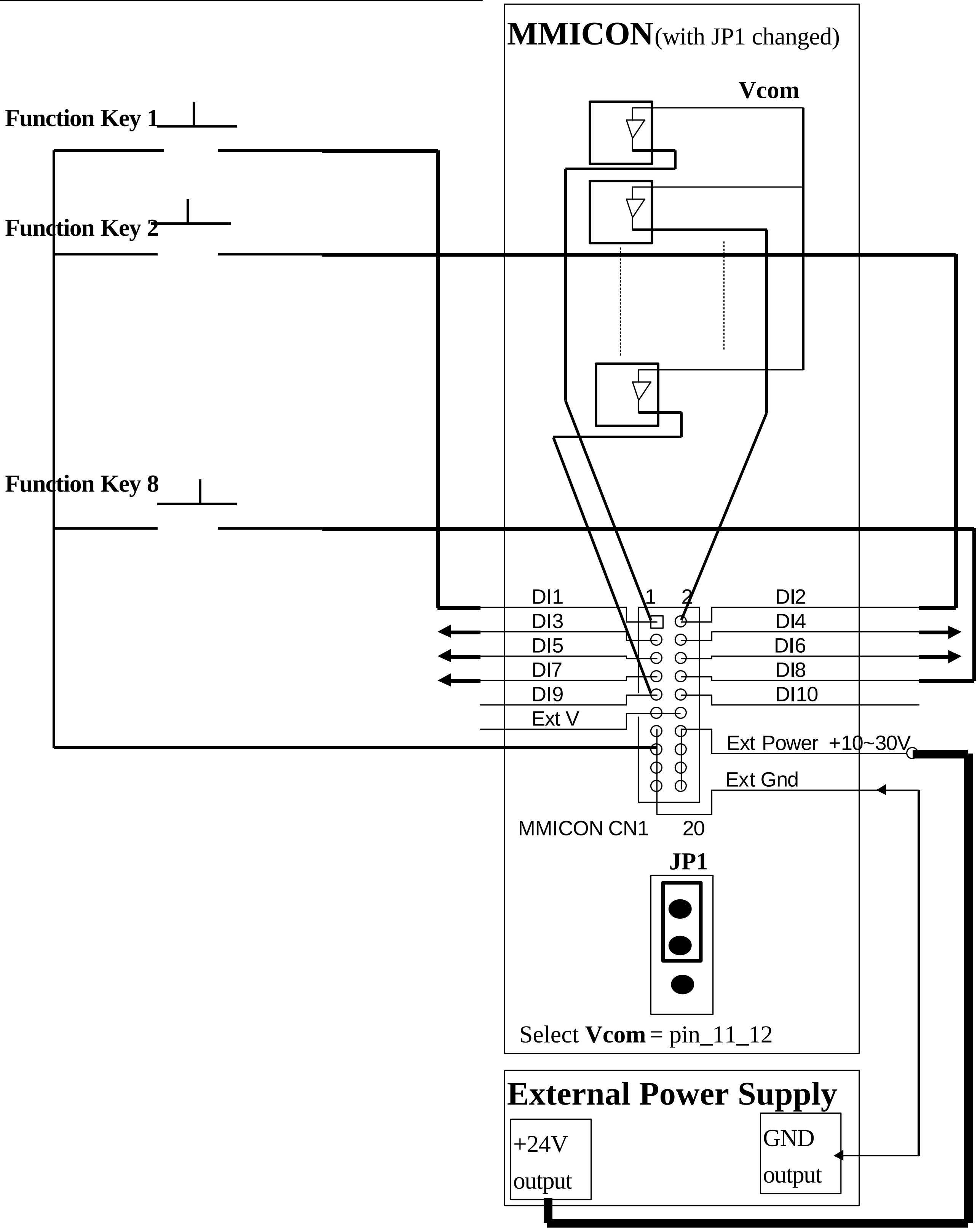




4*4 KBD connection

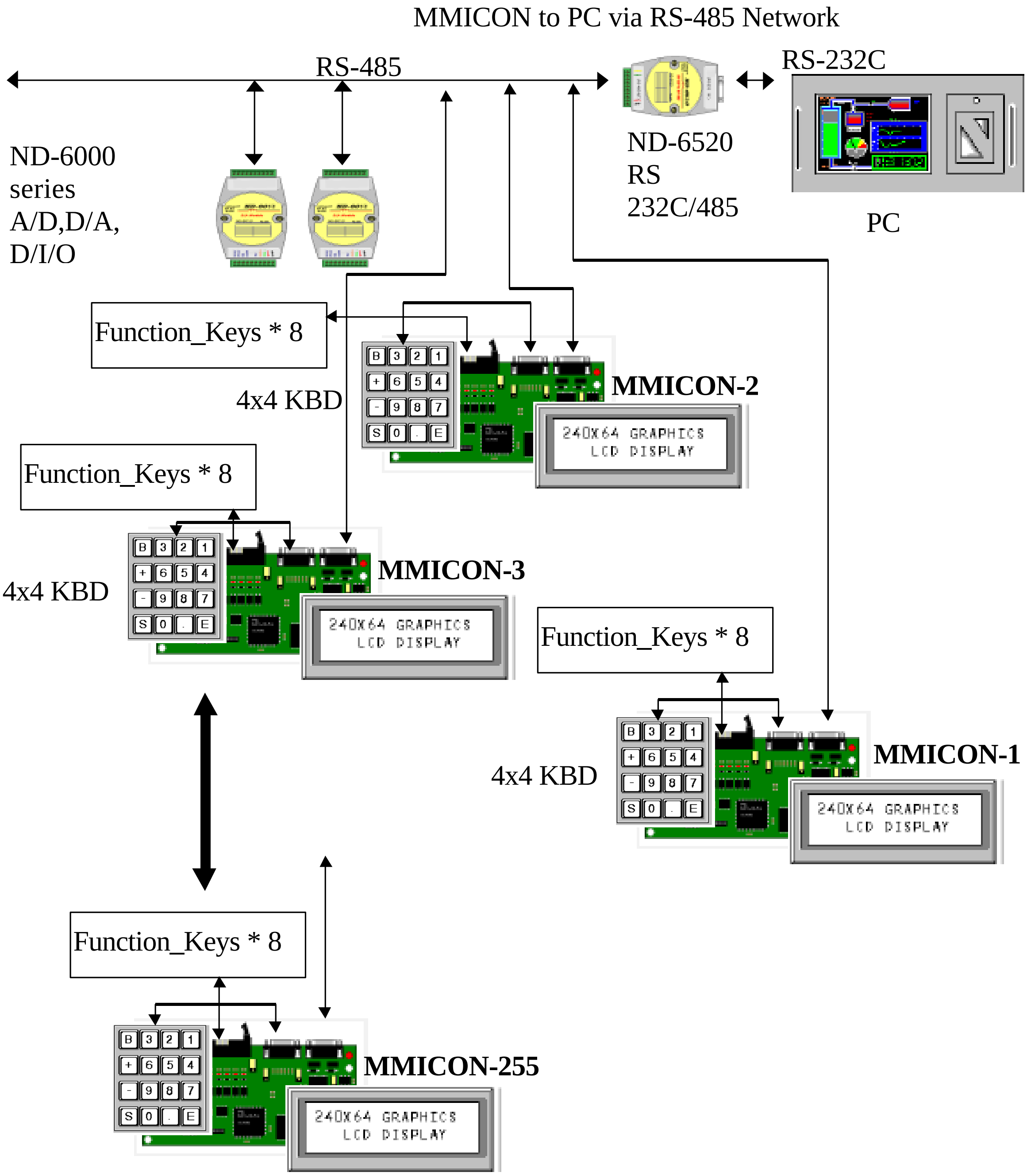


Function Key * 8 connection diagram.

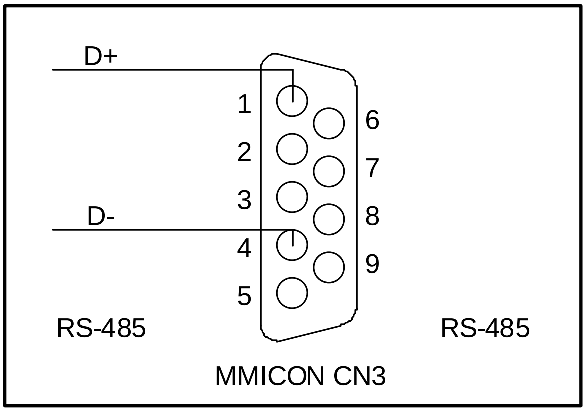


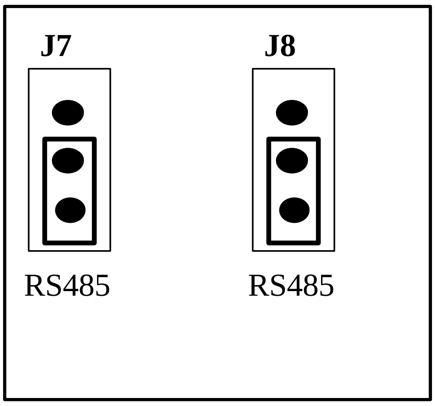
5. PC RS485 Interface Application

J9 must select normal position.

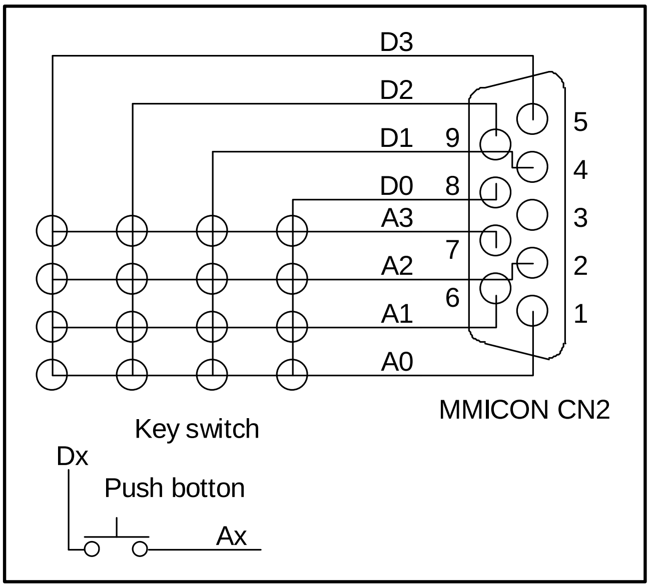


RS485 connection.





4*4 KBD connection



Function Key * 8 connection diagram.

